SIR JOHN BERTRAND GURDON AND HIS CONTRIBUTION TO HISTOLOGY, CYTOLOGY AND EMBRYOLOGY

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Sir John Bertrand Gurdon (born 2 October 1933) is a British developmental embryologist. He is best known for his pioneering research in nuclear transplantation and cloning. He was awarded the Lasker Award in 2009. In 2012, he and Shinya Yamanaka were awarded the Nobel Prize for Physiology or Medicine for the discovery that mature cells can be reprogrammed to become pluripotent. His Nobel Lecture was called "The Egg and the Nucleus: A Battle for Supremacy".

Sir John Bertrand Gurdon received his Doctorate from the University of Oxford in 1960 and was a postdoctoral fellow at California Institute of Technology. He joined Cambridge University, UK, in 1972 and has served as Professor of Cell Biology and Master of Magdalene College. John B. Gurdon challenged the dogma that the specialized cell is irreversibly committed to its fate. He hypothesised that its genome might still contain all the information needed to drive its development into all the different cell types of an organism. In 1962, he tested this hypothesis by replacing the cell nucleus of a frog's egg cell with a nucleus from a mature, specialized cell derived from the intestine of a tadpole. The egg developed into a fully functional, cloned tadpole and subsequent repeats of the experiment yielded adult frogs. The nucleus of the mature cell had not lost its capacity to drive development to a fully functional organism.

The idea led directly to the cloning of Dolly the Sheep by Prof Ian Wilmut in 1996, and to the subsequent discovery by Prof Yamanaka that adult cells can be "reprogrammed" into stem cells for use in medicine. This means that cells from someone's skin can be made into stem cells which in turn can turn into any type of tissue in the body, meaning they can replace diseased or damaged tissue in patients.

The discoveries of Gurdon and Yamanaka have shown that specialised cells can turn back the developmental clock under certain circumstances. Although their genome undergoes modifications during development, these modifications are not irreversible. We have obtained a new view of the development of cells and organisms.

These groundbreaking discoveries made by Sir John Bertrand Gurdon and other scientists have completely changed our view of the development and cellular specialisation. We now understand that the mature cell does not have to be confined forever to its specialised state. By reprogramming human cells, scientists have created new opportunities to study diseases and develop methods for diagnosis and therapy.

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